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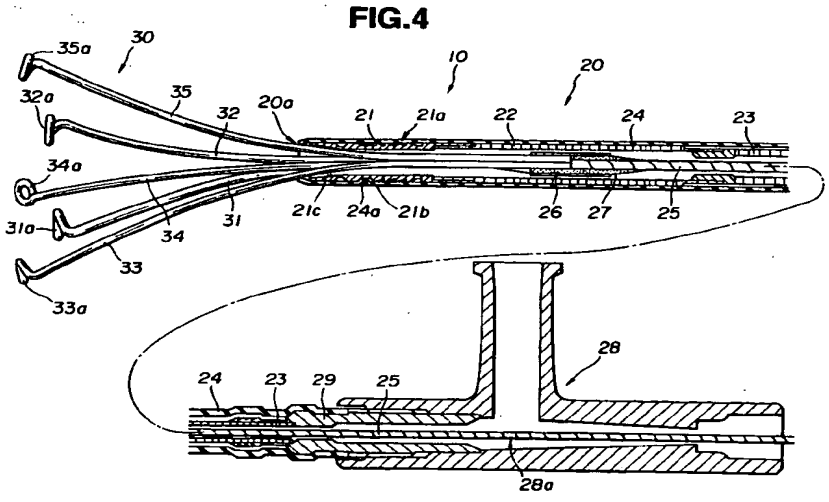
(54) Grasping forceps for endoscope

(57) A grasping forceps (10) for an endoscope according to the present invention includes a flexible insertion section (20), an operating wire (25) adapted to pass through the insertion section (20) and to be advanced and retreated in accordance with the operating of an operating section connected with a hand-end side end portion thereof and at least four elastic grasping members (31 to 35) of different lengths arranged at the leading end portion of the operating wire (25) and having the habit of flexing such that leading end grasping portions (31a to 35a) formed at their leading end portions respectively spread outwardly from the central position of the insertion section (20). At least four elastic grasping members (31 to 35) constructing the elastic grasping section (30) are arranged in the order of increasing length to the leading end grasping portions (31a to 35a) with respect to the leading end face of the insertion section (20), and between the longest elastic grasping member (35) and the shortest elastic grasping member (31) in length to the leading end grasping portions in the circularly spread state of the elastic grasping members (31 to 35) there are provided other elastic grasping members (32 to 34).

FIG.4



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a grasping forceps for an endoscope which is inserted into a channel formed in an endoscope for allowing a treating instrument to pass therethrough and used for grasping and picking out an object such as a foreign body, polypus and so on within a body cavity.

2. Disclosure of the Related Art

Recently, in addition to the medical examination of a body cavity by an endoscope, there has been known such an art that a grasping forceps for an endoscope such as an in vivo inspection forceps, a grasping forceps inserted into a treating instrument passing channel formed in the endoscope is inserted into the body cavity for grasping and recovering a foreign body within a living body or for grasping and picking out cellular tissue to be inspected.

The grasping forceps for the endoscope comprises a flexible insertion section composed of a coil sheath and the like externally covered with, for example a flexible resin tube, an operation wire passing through this insertion section, an operating section connected with the operating wire at its hand-side end, and a grasping section composed of a plurality of elastic grasping members arranged at the leading end of the operating wire.

For example, as shown in Fig. 1, the elastic grasping section 2 of the grasping forceps 1 for the endoscope comprises three elastic grasping members 2a, 2b, 2c. This elastic grasping section 2 is connected at its hand-side end with the operating wire (not illustrated) passing through the interior of the insertion section 3, and the elastic grasping members 2a, 2b, 2c are projected and concealed from the leading end face 3a of the insertion section 3 in accordance with the advancing and retreating operations of the operating wire so as to open and close the elastic grasping section 2.

That is, when the operating wire is operationally pushed out, the elastic grasping members 2a, 2b, 2c are projected from the leading end face 3a of the insertion section 3. Thereupon, circular pawls 4a, 4b, 4c formed at the leading end portions of the respective elastic grasping members 2a, 2b, 2c are spread outward from the center of the insertion section 3 due to the elastic restoring forces of the elastic grasping members 2a, 2b, 2c. On one hand, as the elastic grasping members 2a, 2b, 2c are pulled into the insertion section 3 by the traction operation of the operating wire, the circular pawls 4a, 4b, 4c formed at the leading end portions of the elastic grasping members 2a, 2b, 2c are closed gradually to grasp a foreign body and the like.

But, since this forceps 1 for the endoscope has the elastic grasping section 2 composed of three grasping members 2a, 2b, 2c, the gaps between the adjacent elastic grasping members are wide. Therefore, the once grasped living body tissue or foreign body might occasionally drop through the gaps between the elastic grasping members.

Thereupon, in order to prevent the once grasped living body tissue or foreign body from dropping through the gaps between the elastic grasping members, the applicant of the present invention has proposed a forceps for an endoscope by the Japanese Patent Application No. Hei. 6 (1994)-181503, wherein the elastic grasping section of the forceps for the endoscope comprises at least four elastic grasping members of different lengths, the circular pawls formed at the leading end portions of the elastic grasping members are arranged so as to come into a spiral fashion to narrow the gaps between the elastic grasping members when the elastic grasping members comprising those elastic grasping members of different lengths are spread, and the circular pawls formed at the leading end portions of the elastic grasping members can be converged within the insertion section in a longitudinally lined up manner.

In the forceps for the endoscope proposed in the above-mentioned Japanese Patent Application No. Hei.6 (1994)-181503, however, when the elastic grasping portion composed of the elastic grasping members of different lengths is spread, since the elastic grasping section is constructed such that the circular pawls formed at the leading end portions of the elastic grasping members can be arranged in the spiral fashion, the longest elastic grasping member and the shortest elastic grasping member are located at adjacent positions each other in the opened state.

As shown in Fig. 2, when the longest elastic grasping member 5e and the shortest elastic grasping member 5a of the elastic grasping members 5a, 5b, 5c, 5d, 5e of different lengths which construct the elastic grasping section 5 are located at adjacent positions by any chance, the positional differential distance a between the circular grasping portion 6e of the longest elastic grasping member 5e and the circular grasping portion 6a of the shortest elastic grasping member 5a in the longitudinal direction of the insertion section becomes maximum in the opened state of the elastic grasping section 5, so that it is apprehended that they fail to grasp a small polypus or foreign body.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the present invention to provide a grasping forceps for an endoscope which is provided with an elastic grasping section which is capable of reliably grasp a small polypus or foreign body.

It is another object of the present invention to provide a treating instrument for an endoscope including a grasping forceps for an endoscope in which a leading end face of an insertion section to be inserted into a body cavity is improved in safety.

In brief, a grasping forceps for an endoscope according to the present invention is provided with a flexible insertion section, an operating wire passing through the insertion section and connected at its hand-side end with an operating section so as to be advanced and retreated in accordance with operation of the operating section, and at least four elastic grasping members of different lengths arranged at the leading end of the operating wire and having the habit of flexing such that leading end grasping portions formed at their leading ends respectively tend to spread from the center axis of the insertion section to the outside thereof, wherein at least four elastic grasping members constituting the elastic grasping section are arranged in the order of increasing length to the leading end grasping portion with respect to the leading end face of the insertion section, and between the longest elastic grasping member and the shortest elastic grasping member in length to the leading end grasping portion in the circularly spread state of the elastic grasping members there are provided other elastic grasping members.

The other features and advantages of the present invention will become apparent sufficiently to those skilled in the art as disclose is made in the following description thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1 and 2 show a grasping portion of a conventional grasping forceps for an endoscope.

Fig. 1 is an explanatory view showing the grasping forceps for the endoscope having the elastic grasping section composed of three elastic grasping members.

Fig. 2 is an explanatory view showing the grasping forceps for the endoscope having the elastic grasping section composed of five elastic grasping members of different lengths.

Figs. 3 through 6 show a first embodiment of the present invention.

Fig. 3 is an explanatory view showing a use condition of the grasping forceps for the endoscope.

Fig. 4 is a sectional view explaining a construction of the grasping forceps for the endoscope.

Fig. 5 shows an opened state of the elastic grasping section of the grasping forceps for the endoscope.

Fig. 5A is a perspective view explaining the opened state of the elastic grasping section of the grasping forceps for the endoscope.

Fig. 5B is a longitudinal sectional view explaining the opened state of the elastic grasping section of the grasping forceps for the endoscope.

Fig. 6 is a view showing a closed state of the elastic grasping section of the grasping forceps for the endoscope.

Fig. 7 is a sectional view showing a schematic construction of a leading end portion of an insertion section of a grasping forceps for an endoscope according to the second embodiment of the present invention.

Fig. 8 is a sectional view showing a schematic construction of a leading end portion of an insertion section of a grasping forceps for an endoscope according to a variant example of the second embodiment.

Fig. 9 is an explanatory view showing a schematic construction of a high-frequency snare as another treating instrument for the endoscope passing through an insertion channel thereof for use.

Fig. 10 is a sectional view showing a construction of a leading end portion of an insertion section of the high-frequency snare.

Fig. 10A is a sectional view showing a construction of a leading end portion of an insertion section of a conventional high-frequency snare.

Fig. 10B is a sectional view showing a leading end portion of an insertion section of a high-frequency snare applied with the construction of the leading end portion of the insertion section of the grasping forceps for the endoscope according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A first embodiment of the present invention will be explained with reference to Figs. 3 through 6.

As shown in Fig. 3, a grasping forceps 10 for an endoscope is inserted from a treating instrument insertion opening 12 formed in the endoscope 11 into a forceps channel (not illustrated) formed within an endoscope insertion section 13 so as to pass through an insertion portion 20 for introduction into a body cavity. In this grasping forceps 10 for the endoscope, an elastic grasping section 30 composed of at least four elastic grasping members, for example five elastic grasping members 31, 32, 33, 34, 35 in this embodiment is disposed at the leading end portion of an operating wire passing through an internal bore of the insertion section 20 so as to be able to grasp and pick out an object such as a foreign body, polypus, living body tissue and so on within a body cavity. This elastic insertion section 30 is adapted to be opened and closed in accordance with pushing and pulling operations of a finger engagement portion 41 of an operating section 40 with which the operating wire is connected at its hand-side end.

As shown in Fig. 4, the insertion section 20 of the grasping forceps for the endoscope comprises a metallic tubular leading end member 21, a flexible coil sheath 22 on the leading end side and a coil sheath 23 on the base end side which are connected in order with one another, and these leading end member 21, the coil sheath 22 on the leading end side and the coil sheath 23 on the base end side are externally covered with a flexible integument tube 24. This integument tube 24 serves to prevent turning over at an insertion section leading end face 20a and has a leading end portion of which diameter is smaller than that of the metallic tubular leading end member 21 connected with the leading end of the coil sheath 22 on the leading end side and which projects

about 0.5 mm beyond the leading end member 21 so as to prevent exposure of the leading end member 21.

Incidentally, the outer peripheral surface of the leading end member 21 is provided on its hand-end side with a plurality of saw-teeth like grooves 21a, 21a ... for preventing the positional shifting of the integument tube 24 and on the leading end side with integument tube anchoring grooves 21b which are located in front of those plural saw-teeth like grooves 21a, 21a ... and deeper than the saw-teeth like groove 21a. An anchoring portion 24a between the integument tube 24 and the leading end member 21 is formed by tightly winding a twisted string around the outer periphery of the integument tube 24 located above the integument tube anchoring groove 21b so that the integument tube anchoring grooves catch the integument tube 24 therein and then fixing the twisted string by adhesive. Thereby, an outer diameter of the anchoring portion 24a becomes substantially equal to that of the integument tube 24, so that they can move smoothly without any hitching over the range from the treating instrument insertion opening 12 formed in the endoscope 11 to the forceps channel (not illustrated) formed within the endoscope insertion section 13. A sheath connection member 29 is connected by adhesive to the hand-end side end portion of the base end side coil sheath 23 constructing the insertion section 20, and this sheath connection member 29 is connected with a cock 28 through threads and adhesive.

On one hand, the operating wire 25 to the leading end of which five elastic grasping members 31, 32, 33, 34, 35 constructing the elastic grasping portion 30 in this embodiment are connected passes through the interior of the insertion section 20.

The elastic grasping members 31, 32, 33, 34, 35 are fixedly connected with the operating wire 25 through a coupling tube 26. That is, the hand-end side end portions of the elastic grasping members 31, 32, 33, 34, 35 are bundled and inserted into the coupling tube 26 from its one end side and the leading end portion of the operating wire 25 is inserted into the coupling tube 26 from its other end side. The bundled hand-end side end portions of the elastic grasping members 31, 32, 33, 34, 35 and the leading end portion of the operating wire 25 are brought into contact with one another nearly at the middle of the coupling tube 26 and fixedly connected by soldering so that a hardened portion 27 formed by the soldering becomes small in size.

The lengths of the elastic grasping members 31, 32, 33, 34, 35 are different from one another, namely the elastic grasping members are designated by the symbols 31, 32, 33, 34, 35 in the order from the shortest one to the longest one. As shown in Figs. 5A and 5B, when circular grasping portions 31a, 32a, 33a, 34a, 35a of the elastic grasping portion 30 composed of the elastic grasping members 31, 32, 33, 34, 35 of different lengths are arranged nearly along an identical circumference in the opened state, and between the shortest elastic grasping member 31 and the longest elastic grasping member 35 there are provided other elastic grasping members such that the longest one 35 and the shortest one 31 are not located adjacently to each other. As shown in Fig. 6, when all the elastic grasping members 31, 32, 33, 34, 35 constructing the elastic grasping section 30 are accommodated within the coil sheath on the leading end side, the respective circular pawl portions 31a, 32a, 33a, 34a, 35a are converged within the insertion section 20 in a longitudinally lined up manner without any superposition.

The circular pawl portions 31a, 32a, 33a, 34a, 35a are formed as the leading end grasping portions at the leading end portions of the elastic grasping members 31, 32, 33, 34, 35 respectively so as to face inwardly smoothly with respect to the advancing and retreating direction of the operating wire 25 by bending those leading end portions inwardly so as to have nearly 1.3~1.5-fold circularly spiralled configurations. Thereupon, for the safety sake, bent portions of the elastic grasping members 31, 32, 33, 34, 35 and bent portions formed at the leading end faces are finished smoothly so that those circular pawl portions 31a, 32a, 33a, 34a, 35a don't damage the body cavity wall as well as the bent leading end faces are opposed to the bent portions so as to prevent hitching.

Incidentally, a stainless steel wire, a spring stainless steel wire or the like is used for those elastic grasping members 31, 32, 33, 34, 35. A wire diameter for those elastic grasping members 31, 32, 33, 34, 35 is set to about 0.32 mm so as to flex and deflect largely. The elastic grasping members 31, 32, 33, 34, 35 have the habit of flexing so as to spread outwardly from the center axis of the insertion section 20 when they project from the insertion section leading end face 20a and to have a circle diameter at least 20 mm in the spread state. This is the reason why the possibility limit of cutting off living body tissue and the like by the endoscope is about 20 mm.

As shown in the above-mentioned Fig. 4, the leading end member 21 is provided in its leading end side inner peripheral surface with an inclined surface portion 21c so that the elastic grasping members 31, 32, 33, 34, 35 can move smoothly.

Further, in order to prevent buckling of the operating wire 25 around at the cock 28 having a wide interior space 28a, the surface of the operating wire 25 is coated with wax and the like for improving its sliding capability.

The operating wire 25 is connected at its hand-end side end portion with the finger engagement member 41 of the operating section 40 provided on an operator hand side so as to be operationally pushed and pulled through the interiors of the coil sheath 22 on the leading end side and the coil sheath 23 on the base end side.

Functions of the grasping forceps 10 for the endoscope having the above-mentioned construction will be explained hereinafter.

Firstly, the insertion portion 20 of the grasping forceps 10 for the endoscope is inserted from the treating instrument insertion opening 12 of the endoscope 11 into the treating instrument passing channel thereof under

such a condition that the operating wire 25 of the grasping forceps 10 for the endoscope is pulled, namely under such a condition that the circular pawl portions 31a, 32a, 33a, 34a, 35a located at the leading end portions of the elastic grasping section 30 are closed, and then the insertion section 20 is projected from the leading end portion of the endoscope which is inserted near to cellular tissue to be inspected.

When the finger engagement member 41 provided in the operating section 40 of the grasping forceps 10 for the endoscope is pushed so as to move the operating wire 25 toward the leading end side, the elastic grasping members 31, 32, 33, 34, 35 staying within the leading end member 21 and the coil sheath 22 on the leading end side disposed on the insertion section leading end side of the grasping forceps 10 for the endoscope are pushed out of the insertion section leading end face 20a. Thereupon, the circular pawl portions 31a, 32a, 33a, 34a, 35a formed at the leading end portions of the elastic grasping members 31, 32, 33, 34, 35 respectively spread outwardly from the central position of the insertion section 20 owing to the elastic restoring forces of the respective elastic grasping members 31, 32, 33, 34, 35 so as to be arranged along the circle of a diameter at least 20 mm in the spread state.

Subsequently, the finger engagement member 41 of the operating section 40 is pulled so as to move the operating wire 25 toward the hand-end side. Thereupon, as the elastic grasping members 31, 32, 33, 34, 35 are getting accommodated into the leading end member 21 and the coil sheath 22 on the leading end side of the insertion section 20, the circular pawl portions 31a, 32a, 33a, 34a, 35a are closed gradually so as to line up longitudinally of the insertion section 20 and to grasp polypus and the like by convergence.

Then, the grasping forceps 10 for the endoscope is pulled out of the treating instrument passing channel of the endoscope 11 with the elastic grasping section 30 kept in the closed state to complete the recovering of polypus.

In that way, since the elastic grasping section is composed of at least four elastic grasping members of different lengths as well as the longest elastic grasping member and the shortest elastic grasping member are arranged so as not to be adjacent to each other, a length difference between the adjacent elastic grasping members is decreased. In addition, since the leading end grasping portions of the elastic grasping section composed of the elastic grasping members of different lengths are arranged nearly along the identical circumference, small polypus and the like within a body cavity can be reliably grasped and recovered.

Further, since the leading end portion of the integument tube has a smaller diameter than an outer diameter of the tube and is projected about 0.5 mm, the turning over of the integument tube can be prevented as well as the inserting and removing thereof relative to the treating instrument passing channel of the endoscope can be carried out smoothly. Since the metallic tubular leading end member connected with leading end portion of the coil sheath on the leading end side is never exposed, the safety is improved.

Incidentally, though the elastic grasping portions formed at the leading end portions of the elastic grasping members are the circular pawl portions in the above-mentioned first embodiment, the leading end grasping portions are not limited to the circular pawl portions but may be bent pawl portions formed by bending the leading end portions of the elastic grasping members.

Fig. 7 is a sectional view showing a schematic construction of an insertion section leading end portion of a grasping forceps for an endoscope according to a second embodiment of the present invention.

As illustrated, a grasping forceps 10a for an endoscope of this embodiment has an elastic grasping portion 30a composed of a plurality of elastic grasping members (exemplarily, only three members are illustrated for simplification) 31, 32, 33 and a needle 36 for recovering polypus and the like by stabbing. These plural elastic grasping members 31, 32, 33 and the needle 36 are bundled by a coupling tube 26 and fixedly secured integrally. When the elastic grasping section 30a is brought into the closed state by the traction of the operating wire 25 toward the hand-end side, the needle 36 integrally formed with the elastic grasping portion 30a is set to such a length as to be completely accommodated within the insertion portion. Other constructions are the same as those in the first embodiment, and the same members are designated by the same symbols for omitting explanations about them.

As noted above, since the polypus can be stabbed with the needle 36 for recovery by providing for the grasping forceps 10a for the endoscope having the elastic grasping section 30a provided with the needle 36, it becomes possible to recover the plural polypi while the grasping forceps 10a for the endoscope is once inserted into the body cavity through the treating instrument passing channel of the endoscope.

Incidentally, the needle 36 mounted to the elastic grasping section 30a of the grasping forceps 10a for the endoscope is not limited to a one having a smoothly sharp-pointed leading end as shown in Fig. 7 but may be a one having a step 36b formed at the leading end portion of the needle 36a as shown in Fig. 8.

When the needle having the step formed at its leading end portion in that way is employed, it becomes possible to recover the plural polypi reliably and readily.

By the way, besides the above-mentioned grasping forceps for the endoscope, a high-frequency snare utilizing high-frequnecy current and the like may be used as the treating instrument for the endoscope to be inserted into the treating instrument passing channel formed in the endoscope. This high-frequency snare is provided with various kinds of snare wires of the ellipse type, the half moon type or the mini ellipse type corresponding to shape and size of the polypus.

As shown in Fig. 9, generally in a high-frequency snare 90, when a slider 92 disposed in an operating sec-

tion main body 91 is operationally advanced and retreated, an operating wire 93 connected with the slider 92 is advanced and retreated so that a snare wire 94 connected with the leading end of the operating wire 93 and having a mid portion foldably bent so as to form a loop can be projected and concealed from an insertion portion 95.

That is, in the high-frequency snare 90 under such a condition that the operating wire 93 is pulled toward the hand-end side, the snare wire 94 is accommodated within the insertion portion. When the operating wire 93 is operationally pushed toward the leading end side, the snare wire 94 is projected from the insertion section 95 to spread like a loop as illustrated. Then, the snare wire 94 spread like the loop is made to engage with the polypus, and when the slider 92 of the operating section 91 is operationally pulled toward the hand-end side, the polypus is strongly tightened by the snare wire 94. Subsequently, when high-frequency current is supplied to the snare wire 94 through the operating wire 93, the polypus strongly tightened by the snare wire 94 is cut off by heat.

But, as shown in Fig. 10A, the insertion section 95 of this high-frequency snare 90 has a coil sheath 96 covered with an integument tube 97 formed by a flexible insulating synthetic resin such that the leading end face 97a of this integument tube 97 coincides with the leading end face 96a of the coil sheath 96 or takes a hand-end side position behind the coil sheath leading end face 96a. Thereby, while the high-frequency snare 90 is repeatedly inserted into and drawn out of the treating instrument passing channel (not illustrated) of the endoscope, the leading end face 97a of the integument tube 97 is turned over to expose the coil sheath 96. Therefore, it is apprehended that a force required for inserting and drawing the high-frequency snare 90 into and from the treating instrument passing channel need to be increased, the exposed coil sheath 96 might touch a mucosa at a location except an aimed location within a body cavity or the exposed coil sheath 96 kept in contact with the snare wire 94 might burn the touched location at the time of the supplying of high-frequency current.

Thereupon, the insertion section of the high-frequency snare 90 is constructed as shown in Fig. 10B, in which by operationally advancing and retreating the slider 92 disposed in the operating section main body 92 as shown in Fig. 9, the operating wire 93 connected with the slider 92 is advanced and retreated so as to project and conceal the snare wire 94 disposed at the leading end portion of the operating wire 93 from the insertion section 95.

That is, the insertion section 99 of the high-frequency snare 90 is composed of the flexible coil sheath 96 and the integument tube 97 formed from thermo-plastic synthetic resin, for example such as flexible insulating ethylene tetrafluoride resin and polyethylene, and the coil sheath 96 is covered with the integument tube 97 which projects from the leading end face 96a of the coil sheath 96.

That is, the insertion section 99 is constructed by covering the coil sheath 96 with the integument tube 97. Thereupon, a projecting portion 97b having a smaller diameter than the outer diameter of the integument tube 97 and projecting about 0.5 mm from the leading end face of the coil sheath 96 is formed at the leading end portion of the integument tube 97.

Functions of the high-frequency snare 90 having the above-mentioned construction will be explained hereinafter.

Firstly, the high-frequency snare 90 is inserted into a body cavity through the treating instrument passing channel formed in the endoscope under such a condition that the operating wire 93 is pulled toward the hand-end side, namely under such a condition that the snare wire 94 is accommodated within the insertion portion. Then, the insertion section leading end portion is made to closely approach the aimed location under observation by the endoscope.

Next, the snare wire 94 is made to project from the insertion section and spread by pushing the operating wire 93 toward the leading end side. Then, the spread snare wire 94 is made to engage with the polypus and the like and to strongly tighten the polypus by operationally pulling the operating wire 93 toward the hand-end side, and high-frequency current is supplied to the snare wire 94 through the operating wire 93 to thermally cut off the polypus tightened strongly by the snare wire 94.

In this way, when the insertion section of the high-frequency snare is constructed by covering the coil sheath with the integument tube, the integument tube covering the coil sheath is made to project from the leading end face of the coil sheath so as to have the projecting portion of the smaller diameter than the coil sheath. Therefore, the turning over of the integument tube can be prevented, so that the insertion and draw within the treating instrument passing channel of the endoscope can be performed smoothly. Thus, since also the exposing of the coil sheath which might be caused by the turning over of the integument tube can be prevented, the coil sheath doesn't touch the mucosa of the body cavity at the location except the aimed location.

It will be apparent that various different embodiments can be widely constructed based on the present invention without departing from the spirit and scope of the invention. Accordingly, it is not intended that the present invention is limited by the specific embodiments, except as by the appended claims.

Claims

1. A grasping forceps for an endoscope including:

a flexible insertion section;

an operating wire adapted to pass through said insertion section and to be advanced and retreated in accordance with the operating of an operating section connected with a hand-end side end portion thereof; and

at least four elastic grasping members of dif-

ferent lengths arranged at the leading end portion of said operating wire and having the habit of flexing such that leading end grasping portions formed at their leading end portions respectively spread outwardly from the central position of said insertion section;

wherein at least four elastic grasping members constructing said elastic grasping section are arranged in the order of increasing length to said leading end grasping portions with respect to the leading end face of said insertion section, and between the longest elastic grasping member and the shortest elastic grasping member in length to said leading end grasping portions in the circularly spread state of said elastic grasping members there are provided other elastic grasping members.

2. A grasping forceps for an endoscope as set forth in claim 1, wherein a stainless steel wire or a spring stainless steel wire is used for said elastic grasping members.

3. A grasping forceps for an endoscope as set forth in claim 1, wherein a diameter of said elastic grasping section in the spread state is set to at least 20 mm.

4. A grasping forceps for an endoscope as set forth in claim 1, wherein said elastic grasping section comprises five elastic grasping members, and a wire diameter of each elastic grasping member is set to about 0.32 mm.

5. A grasping forceps for an endoscope as set forth in claim 1, wherein a leading end portion of an integument tube formed by flexible synthetic resin to construct the outermost peripheral surface of said flexible insertion section is made to have a smaller diameter than the outer diameter of said integument tube.

6. A treating instrument for an endoscope in which a leading end section of an integument tube formed by flexible synthetic resin to construct an outermost peripheral surface of an insertion section is formed to have a smaller diameter than the outer diameter of said integument tube and to project from a leading end face of a metallic member constructing said insertion section.

7. A grasping forceps for an endoscope as set forth in claim 5 or a treating instrument for an endoscope as set forth in claim 6, wherein the leading end of said integument tube projects at least 0.5 mm from a leading end face of another member.

8. A grasping forceps for an endoscope as set forth in claim 5 or a treating instrument for an endoscope as set forth in claim 6, wherein said synthetic resin made integument tube is formed by thermo-plastic resin such as tetrafluoroethylene resin and polyethylene.

FIG.1
RELATED ART

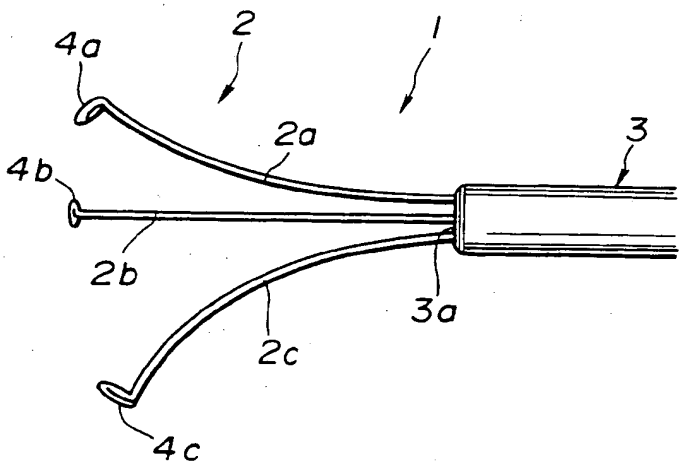


FIG.2
RELATED ART

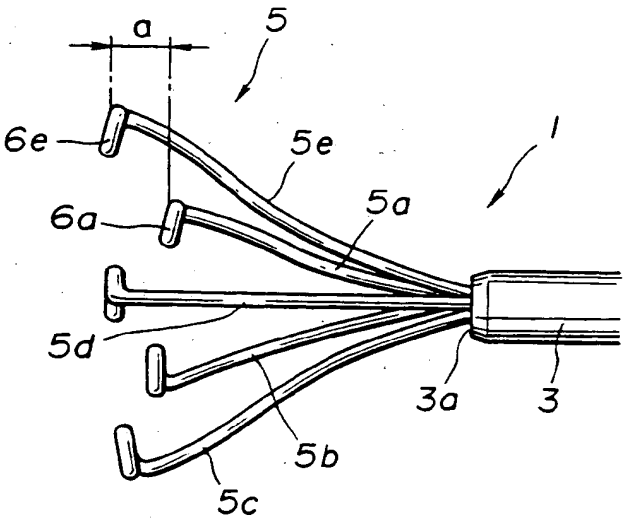


FIG. 3

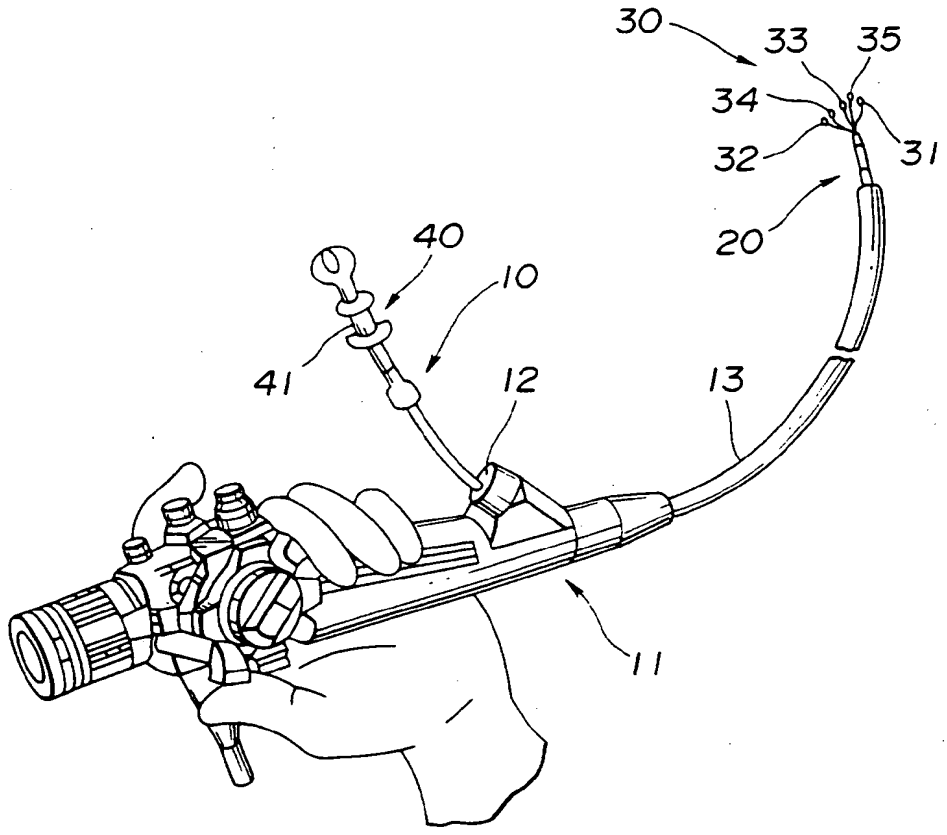


FIG.4

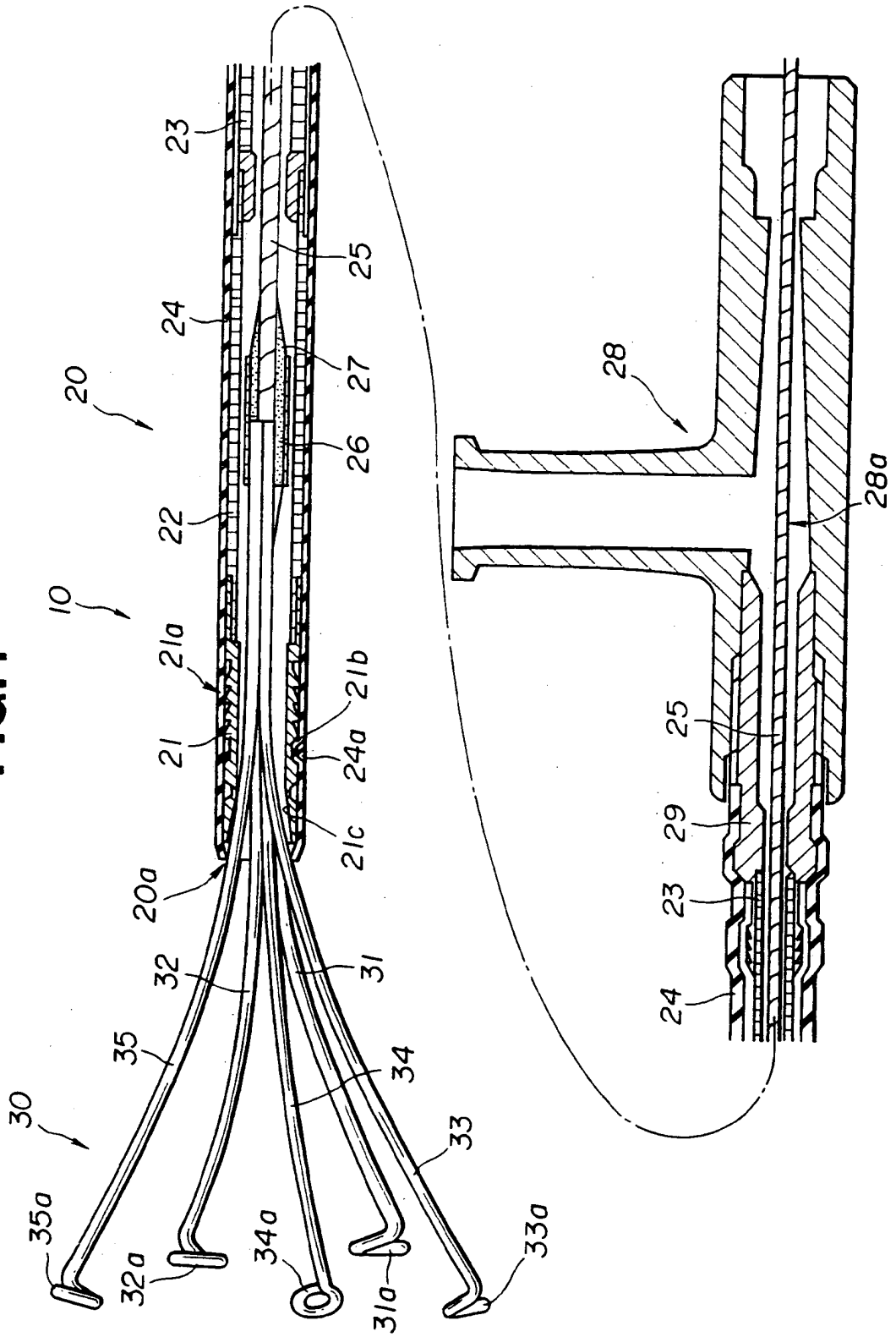


FIG.5A

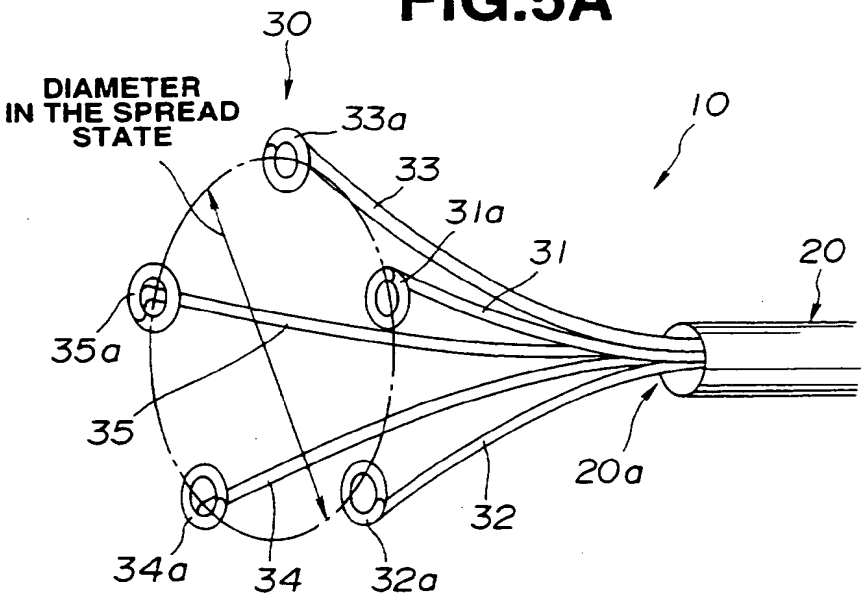


FIG.5B

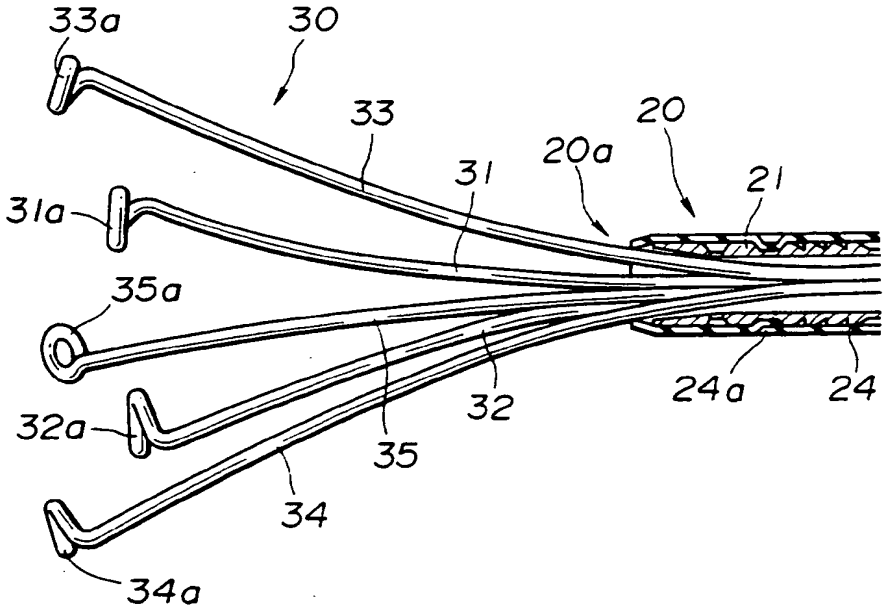


FIG.6

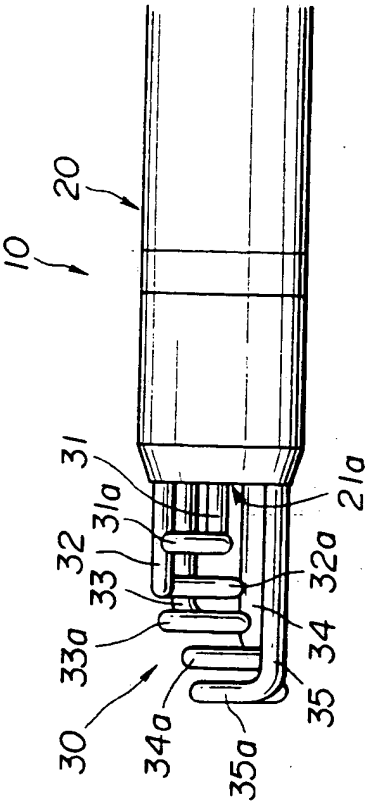


FIG.7

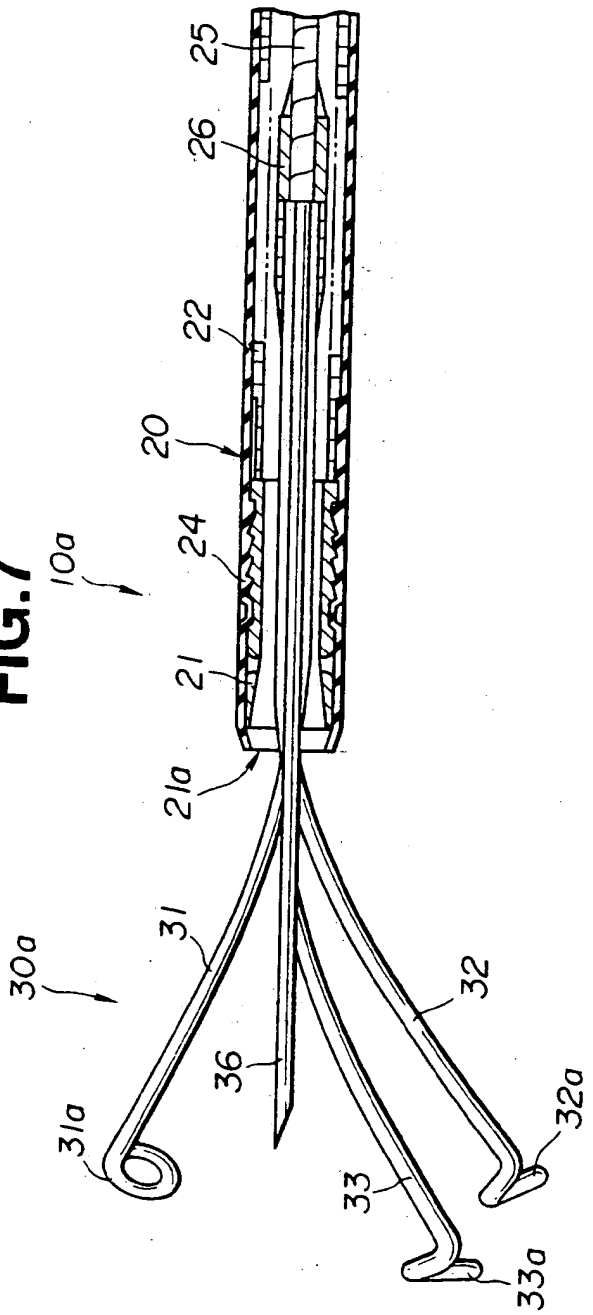


FIG.8

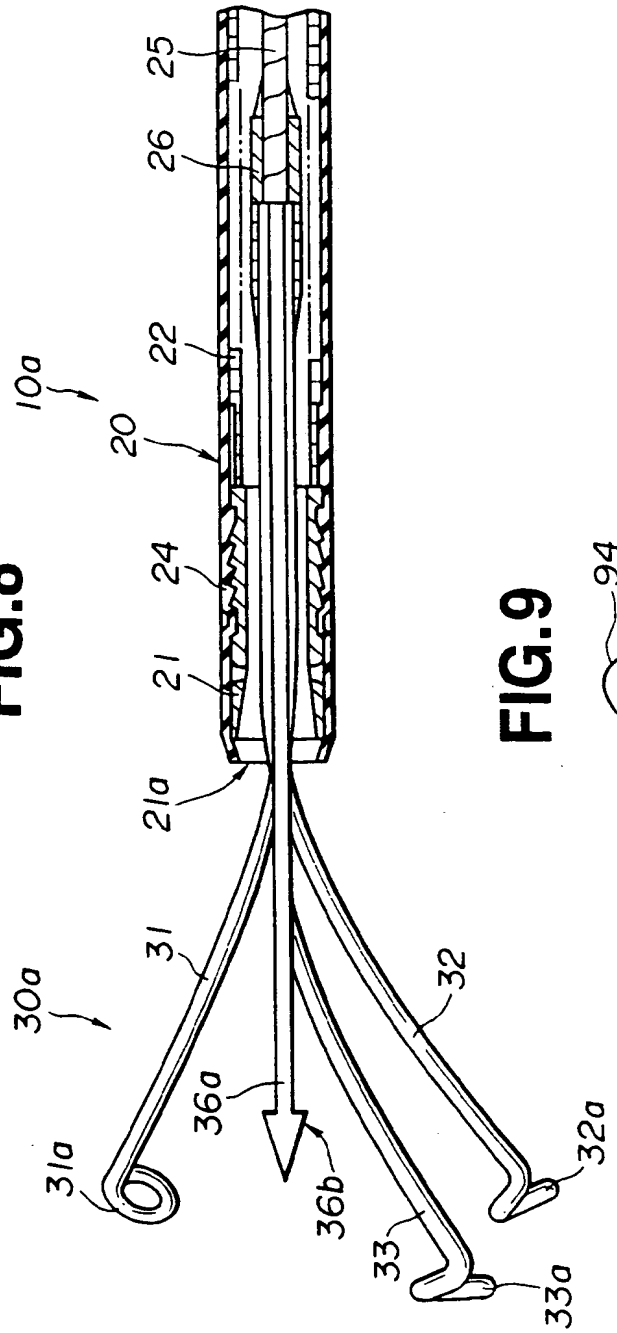


FIG.9

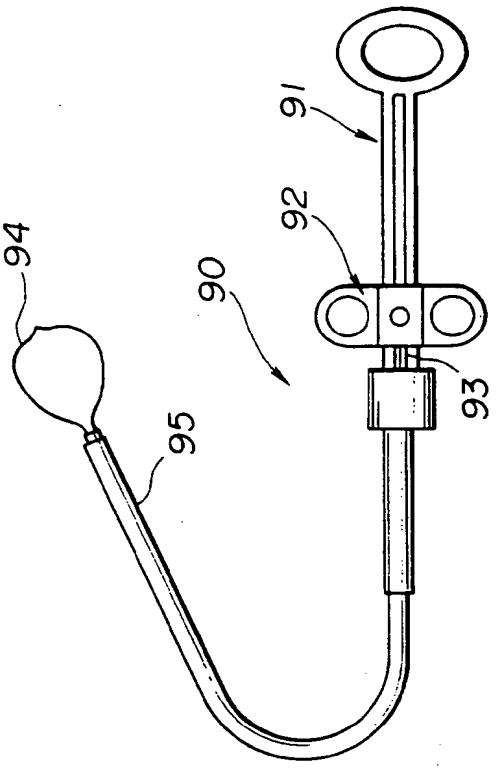


FIG.10A
RELATED ART

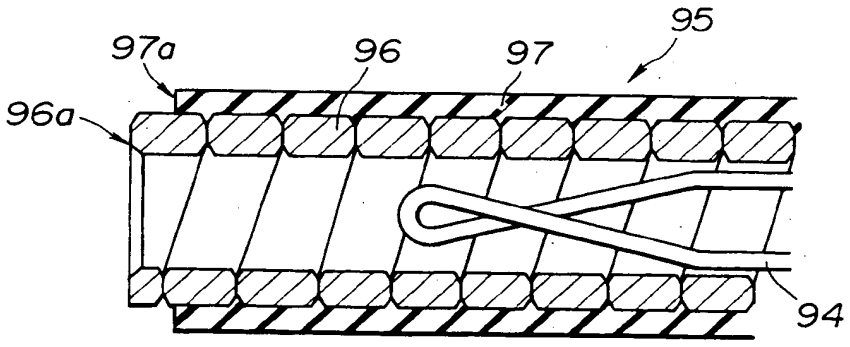
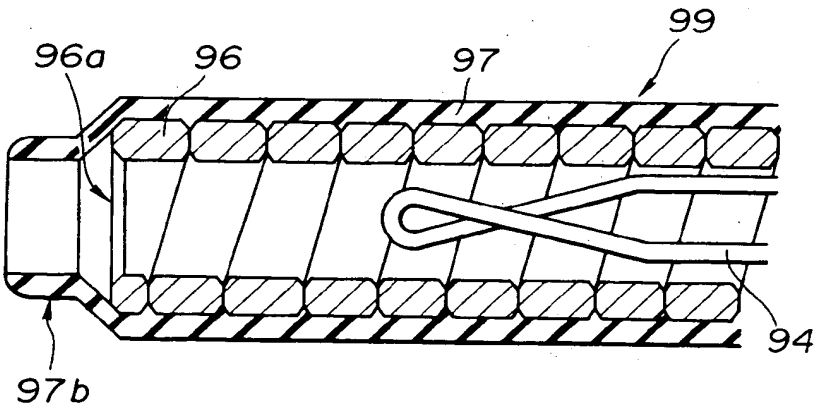


FIG.10B



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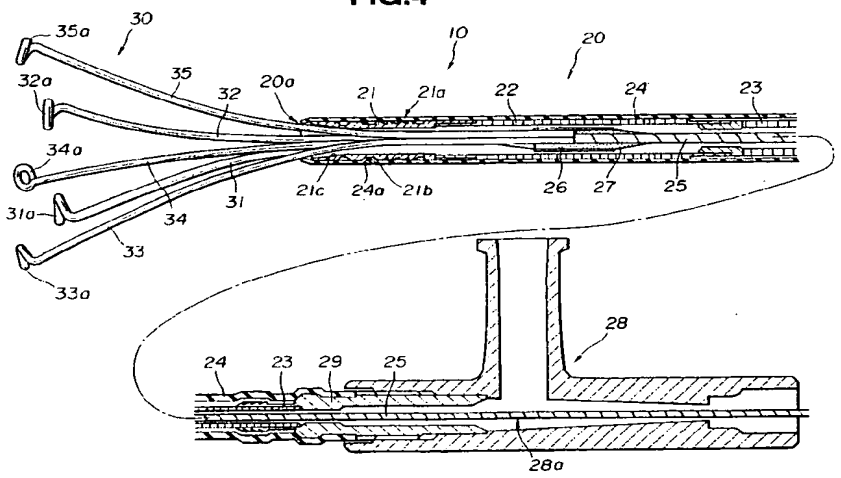
(54) Grasping forceps for endoscope

(57) A grasping forceps (10) for an endoscope according to the present invention includes a flexible insertion section (20), an operating wire (25) adapted to pass through the insertion section (20) and to be advanced and retreated in accordance with the operating of an operating section connected with a hand-end side end portion thereof and at least four elastic grasping members (31 to 35) of different lengths arranged at the leading end portion of the operating wire (25) and having the habit of flexing such that leading end grasping portions (31a to 35a) formed at their leading end portions respectively spread outwardly from the central position of the insertion section (20). At least four elastic grasping members (31 to 35) constructing the elastic grasping section (30) are arranged in the order of increasing length to the leading end grasping portions (31a to 35a) with respect to the leading end face of the insertion section (20), and between the longest elastic grasping member (35) and the shortest elastic grasping member (31) in length to the leading end grasping portions in the circularly spread state of the elastic grasping members (31 to 35) there are provided other elastic grasping members (32 to 34).

FIG.4



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EUROPEAN SEARCH REPORT

Application Number
EP 95 10 6352

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	US-A-4 174 715 (HASSON) * column 2, line 49 - column 3, line 24; figures 1,5 *	1-4 5,7,8	A61B17/22 A61B17/32
X Y	DE-A-36 26 371 (OLYMPUS) * column 5, line 66 - column 6, line 22 * * column 7, line 26 - line 40; figures 1,3 *	6 5,7,8	
A	DE-U-85 35 164 (MASLANKA) * page 5, line 16 - line 28; figure 1 *	1,5-8	
A	DE-A-37 09 706 (OLYMPUS) * column 6, line 6 - line 16; figure 6 *	4	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A61B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	1 April 1996	Moers, R

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